

Improvements in N₂O Calibration of Secondary Compressed Gas Standards

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The CMDL N₂O calibration scale was recently adopted by the WMO Global Atmosphere Watch (GAW) Program as the GAW N₂O reference scale. CMDL, along with the WMO GAW World Calibration Center (Garmisch-Partenkirchen, Germany), will likely be responsible for calibrating secondary compressed gas standards for a number of laboratories around the world.

In order for N₂O measurements made by different laboratories to be useful for examining global sources and sinks of N₂O, inter-laboratory comparability must be within 0.2 ppb. The reproducibility of the gas chromatograph (GC) used by CMDL to calibrate N₂O secondary standards from 1999-2003 was much greater than 0.2 ppb. Consequently, a separate instrument was dedicated to N₂O (along with SF₆) in an attempt to improve CMDL N₂O calibrations. The new instrument has been in operation for slightly more than 1 year. Results from intercomparisons of secondary standards on the new instrument and two other N₂O GCs operating within CMDL suggest that the reproducibility of CMDL N₂O calibrations has been improved to 0.2 ppb. It is expected that a reproducibility of 0.1 ppb can be achieved through modest improvements in precision.

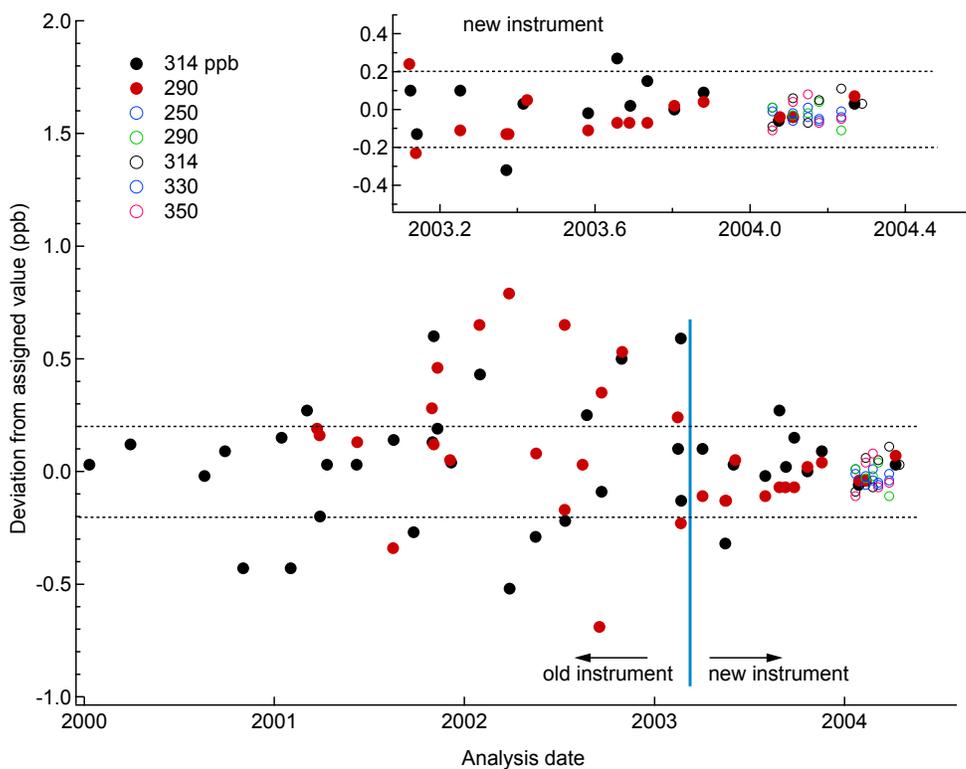


Figure 1. Analysis of several secondary standards on both CMDL N₂O calibration instruments from 2000 to 2004. Note improvement in reproducibility beginning in 2003 (insert). Dashed lines show target reproducibility of ± 0.2 ppb. Solid and open symbols represent two different sets of standards.